

IN THE CLAIMS

Claims 1-8 (Canceled).

Claim 9 (Currently Amended): A semi-finished circuit board assembly comprising:

(a) a circuit board having a top surface and contact pads exposed at said top surface;

(b) a bottom unit including at least one bottom unit chip, said bottom unit having mounting connections facing downwardly toward said circuit board and top connections facing upwardly away from said circuit board, at least some of said mounting connections being aligned with at least some of said contact pads, at least some of said top connections being unoccupied and available to receive one or more additional microelectronic elements, at least some of the unoccupied top connections of said bottom unit overlying at least one said bottom unit chip,

wherein said bottom unit includes a substrate incorporating a dielectric element having an upper surface facing upwardly away from said circuit board and a lower surface facing downwardly toward said circuit board, a plurality of mounting pads exposed at the lower surface of said dielectric element and a plurality of top connection pads exposed at the top surface, said at least one bottom unit chip being mounted beneath said lower surface, said mounting connections including said mounting pads, said top connections including said top connection pads.

Claim 10 (original): A semi-finished circuit board assembly as claimed in claim 9 wherein said top connections are adapted for surface mounting of said one or more additional microelectronic elements to said top connections.

Claims 11-12 (Canceled).

Claim 13 (Currently Amended): A semi-finished circuit board assembly as claimed in ~~claim 12~~ claim 9 further comprising masses of an electrically conductive bonding material extending between said mounting pads and said contact pads of said circuit board.

Claims 14-16 (Canceled).

Claim 17 (previously presented): A multichip assembly comprising:

(a) a bottom unit including at least one bottom unit semiconductor chip, said bottom unit having downwardly-facing mounting pads and upwardly-facing top connection pads;

(b) mounting masses of a fusible electrically conductive bottom bonding material disposed in contact with said mounting pads;

(c) a first packaged semiconductor chip having terminals overlying at least some of said top connection pads;

(d) a top conductive bonding material connecting at least some of said top connection pads and at least some of said terminals of said first packaged semiconductor chip; and

(e) a circuit panel having a top surface and contact pads exposed at said top surface, said mounting masses bonding said mounting pads and said contact pads of said circuit panel,

                  said top conductive bonding material having lesser height than said mounting masses.

Claim 18 (original): An assembly as claimed in claim 17 wherein said top conductive bonding material is provided in layers less than about 40 microns high and said mounting masses are at least about 100 microns high.

Claim 19 (canceled).

Claim 20 (original): An assembly as claimed in claim 17 wherein said bottom unit includes a substrate, at least a portion of said substrate extending above said bottom unit semiconductor chip, at least some of said top connection pads being disposed on said portion of said substrate.

Claim 21 (original): An assembly as claimed in claim 20 wherein said substrate is generally planar and includes a central portion overlying said first bottom unit chip and at least one peripheral portion projecting outwardly beyond said first bottom chip, said mounting pads being disposed in said at least one peripheral portion, said mounting masses extending downwardly from said mounting pads.

Claims 22-23 (Canceled).

Claim 24 (original): An assembly as claimed in claim 20 wherein said bottom unit chip is permanently mounted to said substrate.

Claim 25 (original): An assembly as claimed in claim 20 wherein said first packaged chip includes a die, a package substrate extending beneath such die and terminals on said package substrate, said terminals on said package substrate being bonded to said top connection pads of said bottom unit.

Claim 26 (previously presented): An assembly as claimed in claim 18 wherein said first packaged chip is a chip-size packaged chip.

Claim 27 (previously presented): An assembly as claimed in claim 18 wherein said first packaged chip is a standard packaged chip.

Claim 28 (original): An assembly comprising:

(a) a bottom unit including a first bottom unit semiconductor chip, a substrate having a portion extending over said bottom unit semiconductor chip, upwardly-facing top connection pads and downwardly-facing mounting pads on said substrate, at least some of said top connection pads being disposed in said portion of said substrate, said mounting pads being adapted for connection to contact pads on a circuit board, said bottom unit semiconductor chip being permanently connected to said substrate; and

(b) a first top microelectronic element at least partially overlying said portion of said substrate and said bottom unit chip, said top microelectronic element being removably mounted to said substrate and connected to said top connection pads.

Claim 29 (previously presented): An assembly as claimed in claim 28 wherein said first top microelectronic element is a packaged semiconductor chip.

Claim 30 (original): An assembly as claimed in claim 28 further comprising a top conductive bonding material electrically connecting said top microelectronic element to said top connection pads, said first top microelectronic element being attached to said substrate only by said top conductive bonding material.

Claim 31 (original): An assembly as claimed in claim 28 further comprising a top conductive bonding material

electrically connecting said top microelectronic element to said top connection pads and attaching said first top microelectronic unit to said substrate at a joint therebetween, said joint being non-underfilled.

Claim 32 (original): An assembly as claimed in claim 28 further comprising an encapsulant bonding said bottom unit semiconductor chip to the substrate.

Claims 33-34 (Canceled).

Claim 35 (original): An assembly as claimed in claim 28 wherein said substrate has electrically-conductive traces thereon and said bottom unit chip is electrically connected to said traces by leads integral with said traces.

Claim 36 (original): An assembly as claimed in claim 28 further comprising a circuit panel having contact pads thereon and masses of an electrically conductive bonding material extending between said mounting pads of said substrate and said contact pads of said circuit panel.

Claim 37 (previously presented): An assembly including:

(a) a bottom unit semiconductor chip having a front surface, a rear surface and edges extending between said surfaces;

(b) a substrate having a central portion extending above said bottom unit semiconductor chip, said bottom unit semiconductor chip being mounted to said central portion of said substrate with a surface of the chip facing upwardly toward the substrate, said substrate also having one or more peripheral portions projecting outwardly beyond the edges of the chip;

(c) first and second top microelectronic elements disposed above said substrate so that the first and second top microelectronic elements overlie different areas of said substrate, at least one of said top microelectronic elements extending over said central portion and at least one of said top microelectronic elements extending over said peripheral portion; and

(d) mounting terminals on said substrate electrically connected to at least one of said chips and adapted for mounting said substrate to a circuit board,

wherein said bottom unit semiconductor chip has greater surface area than either of said first and second top microelectronic elements alone.

Claim 38 (canceled).

Claim 39 (original): An assembly as claimed in claim 37 wherein said bottom unit semiconductor chip has a surface area less than the aggregate surface area of said first and second top microelectronic elements.

Claim 40 (original): An assembly as claimed in claim 37 wherein said at least one peripheral portion includes first and second peripheral portions projecting beyond opposite edges of said bottom unit semiconductor chip, and wherein said first top microelectronic element overlies said first peripheral portion and part of said central portion and said second top microelectronic element overlies said second peripheral portion and another part of said central portion.

Claim 41 (original): An assembly as claimed in claim 40 wherein said mounting terminals include mounting pads disposed in said first and second peripheral portions.

Claim 42 (original): An assembly as claimed in claim 41 wherein at said first and second top microelectronic elements overlie at least some of said mounting pads disposed in said first and second peripheral portions.

Claim 43 (original): An assembly as claimed in claim 37 wherein said bottom unit semiconductor chip is permanently connected to said substrate and said top microelectronic elements are removably connected to said substrate.

Claim 44 (original): An assembly as claimed in claim 37 wherein said first and second top microelectronic elements are packaged semiconductor chips.

Claim 45 (original): An assembly as claimed in claim 37 further comprising a circuit panel having contact pads thereon and masses of an electrically conductive bonding material extending between said mounting pads of said substrate and said contact pads of said circuit panel.